

AbstractID: 1356 Title: Automated Detection of Juxta-Pleural Lung Nodules in Chest CT Using Lung Contour Corrected by Anatomic Landmarks

Purpose

In chest CT, detection of lung nodules adjacent to the pleura (juxta-pleural nodules) by CAD algorithms are usually more difficult due to inaccurate segmentation of the lung contour. The contour line along those nodules may appear relatively smooth, so existing methods such as curvature correction, indentation detection or 'rolling ball' may fail to give correct results. In this work, we presented an algorithm to detect juxta-pleural nodules by delineating lung contours more accurately, even in the presence of large and smooth juxta-pleural nodules.

Methods

Initial lung segmentation results were obtained by global thresholding and successive morphological operations. Large airways were also segmented and excluded from the lung region. Contour points along the mediastinum were preserved as control points. On the peripheral region, original contour points that are within certain distance from nearby bony structures were also added into control points. If any bony structures circling the lung are too far away from initial contour line, extra control points were then selected near the margin of them following preset rules. A modified contour line was generated by applying smooth cubic hermit interpolation on the selected control points. The final segmentation result was acquired by combining the initial and modified contour lines. Comparing final and initial lung regions, suspicious structures were marked as nodule candidates.

Results

The algorithm was tested on both simulated images and real chest CT slices from 3 patients. Visual assessment of the initial results showed that our algorithm detected juxta-pleural nodules and delineated their contour accurately.